Problem 1. Find the general solution of the equation
\[ t^2 y'' + 2ty' - 2y = t \]
using the method of variation of parameters, using the fact that \( y_1(t) = t \) is a solution to the homogeneous equation.

For Problems 2-3, find the Laplace transform of the function \( f(t) \).

Problem 2. \( f(t) = (2t + 3)^2 \).

Problem 3. \( f(t) = (e^{2t} + 1)^2 \).

For Problems 4-5, find the inverse Laplace transform of \( F(s) \).

Problem 4.
\[ F(s) = \frac{1}{s - s^2}. \]

Problem 5.
\[ F(s) = \frac{s + 2}{s^2 - 3s + 2}. \]